

What is claimed is:

1. A method comprising:

receiving a packet of encoded data; and

decoding the packet using a look-up table that stores

5 information approximating output of an algorithmic decoding process.

2. The method of claim 1 including performing joint quantization of the data packet before decoding.

10 3. The method of claim 1 wherein data in the packet is encoded by turbo coding.

15 4. The method of claim 3 wherein decoding includes processing the data packet using a parallel concatenated turbo decoder.

5. The method of claim 1 including decoding the packet using a table that stores information approximating output  
20 of a soft-input soft-output algorithmic decoding process, a soft-input hard-output algorithmic decoding process, a hard-input soft-output algorithmic decoding process, or a hard-input hard-output algorithmic decoding process.

6. A method comprising:

(a) receiving encoded symbols;

(b) compressing the symbols;

(c) decoding the compressed symbols using a first

5 look-up table that stores information approximating output  
of an algorithmic decoding process;

(d) arithmetically combining the compressed symbols  
with the decoded symbols to obtain a first result; and

(e) decompressing the first result.

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7. The method of claim 6 including:

(f) interleaving the decompressed first result;

(g) compressing the interleaved first result;

(h) decoding the compressed, interleaved first result

15 using a second look-up table that stores information  
approximating output of an algorithmic decoding process;

(i) arithmetically combining the decoded first result  
with the compressed, interleaved first result to obtain a  
second result;

20 (j) decompressing the second result; and

(k) de-interleaving the decompressed second result.

8. The method of claim 7 including:

repeating (b) through (k) until predetermined criteria is satisfied; and

determining information bits corresponding to the received encoded symbols.

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9. An apparatus comprising:

a memory storing a look-up table with information approximating output of an algorithmic decoding process; and

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a processor configured to use the look-up table to decode data packets encoded by convolutional coding.

10. The apparatus of claim 9 wherein the table stores information approximating a soft-input soft-output algorithmic decoding process, a soft-input hard-output algorithmic decoding process, a hard-input soft-output algorithmic decoding process, or a hard-input hard-output algorithmic decoding process.

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11. The apparatus of claim 10 including a joint quantization module for converting soft symbols in the packet into soft multi-symbols prior to the processor's decoding the data packets using the look-up table.

12. The apparatus of claim 10 wherein the processor is configured to decode the packet by turbo decoding.

13. An apparatus comprising:

5 memory storing a first look-up table with information approximating output of an algorithmic decoding process; and

a processor configured to

(a) compress a packet of received encoded symbols;

10 (b) decode the compressed symbols using the first look-up table;

(c) arithmetically combine the compressed symbols with the decoded symbols to obtain a first result; and

(d) decompress the first result.

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14. The apparatus of claim 13 wherein the memory stores a second look-up table with information approximating output of an algorithmic decoding process and wherein the processor is configured to:

20 (e) interleave the decompressed first result;

(f) compress the interleaved first result;

(g) decode the compressed, interleaved first result using the second look-up table;

(h) arithmetically combine the decoded first result with the compressed, interleaved first result to obtain a second result;

(i) decompress the second result; and

5 (j) de-interleave the decompressed second result.

15. The apparatus of claim 14 wherein the processor is configured to:

repeat (a) through (j) until predetermined criteria is  
10 satisfied; and

determine information bits corresponding to the encoded symbols.

16. An article comprising a computer-readable medium that  
15 stores computer-executable instruction for causing a computer system, in response to receiving a encoded data packet, to use a look-up table that approximates output of an algorithmic decoding process to decode the packet.

20 17. The article of claim 16 including instructions for causing the computer system to perform joint quantization before using the look-up table to decode the packet.

18. The article of claim 16 wherein data in the packet to be decoded was encoded by turbo coding.

19. An article comprising a computer-readable medium that  
5 stores computer-executable instruction for causing a computer system to:

(a) compress a packet of received encoded symbols;

(b) decode the compressed symbols using a first look-up  
10 process;

(c) arithmetically combine the compressed symbols with the decoded symbols to obtain a first result; and

(d) decompress the first result.

15 20. The article of claim 19 including instructions for causing the computer system to:

(e) interleave the decompressed first result;

(f) compress the interleaved first result;

(g) decode the compressed, interleaved first result  
20 using a second look-up table approximating output of an algorithmic decoding process;

(h) arithmetically combine the decoded first result with the compressed, interleaved first result to obtain a second result;

(i) decompress the second result; and

(j) de-interleave the decompressed second result.

21. The article of claim 20 including instructions for

5 causing the computer system to:

repeat (a) through (j) until predetermined criteria is  
satisfied; and

determine information bits corresponding to the  
encoded symbols.

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22. The article of claim 16 including instructions for  
causing the computer system to decode the compressed  
symbols using a first look-up table approximating output of  
a soft-input soft-output algorithmic decoding process, a  
15 soft-input hard-output algorithmic decoding process, a  
hard-input soft-output algorithmic decoding process, or a  
hard-input hard-output algorithmic decoding process.

23. A method comprising:

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receiving a packet of encoded symbols;

jointly quantizing multiple symbols;

decoding the jointly quantized symbols to obtain a  
result; and

decompressing the result into individual decoded symbols.

24. The method of claim 23 including decoding the jointly  
5 quantized symbols using a look-up table that approximates  
output of an algorithmic decoding process.

25. The method of claim 23 including decoding the jointly  
quantized symbols using a look-up table that approximates  
10 output a soft-input soft-output algorithmic decoding  
process, a soft-input hard-output algorithmic decoding  
process, a hard-input soft-output algorithmic decoding  
process, or a hard-input hard-output algorithmic decoding  
process.

26. An article comprising a computer-readable medium that  
stores computer-executable instruction for causing a  
computer system, in response to receiving a packet of  
15 encoded symbols, to:

20 jointly quantize multiple ones of the symbols;  
decode the jointly quantized symbols to obtain a  
result; and  
decompress the result into individual decoded symbols.



27. The article of claim 26 including instructions for causing the computer system to decode the jointly quantized symbols using a look-up table that approximates output of an algorithmic decoding process.

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28. The method of claim 26 including instructions for causing the computer system to decode the jointly quantized symbols using a look-up table that approximates output a soft-input soft-output algorithmic decoding process, a soft-input hard-output algorithmic decoding process, a hard-input soft-output algorithmic decoding process, or a hard-input hard-output algorithmic decoding process.

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